California Public Utilities Commission

The Technologies that Make Up a Smart Grid

Laura Ipsen

SVP/GM Smart Grid
Co-Chair EcoBoard

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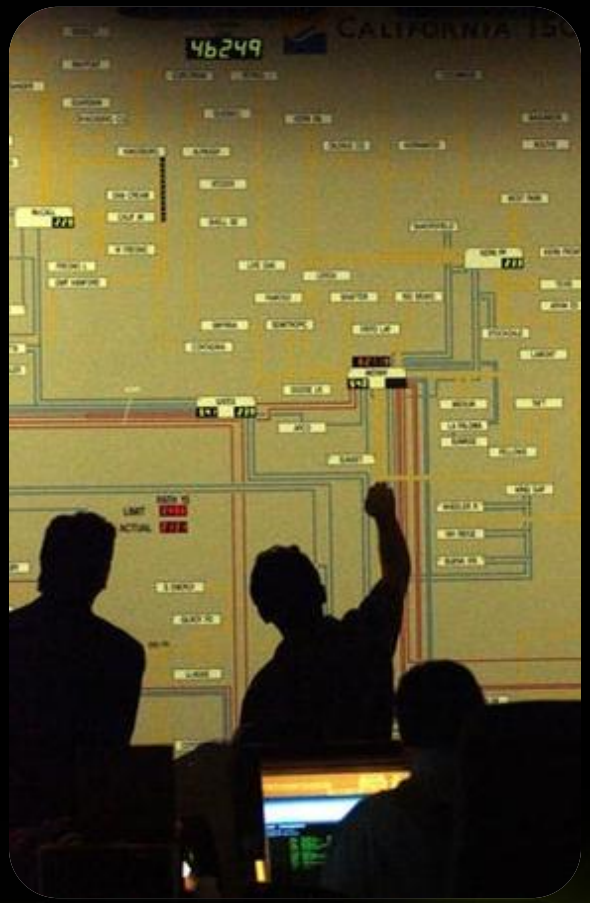
Cisco Smart Grid
Long Term Vision

- Design and architect end-to-end IP communications platform, integrated with the power grid
- Converged, standards-based, interoperable network across the entire energy chain from generation to prosumer
- Reliable, resilient, and secure communications
- Interact with commercial, industrial, and residential control systems



Smart Grid Technologies

Integrated Networking and Security

- Ruggedized routers and switches, wireless communication
- Physical security, data protection and access security

Operations Management

- Analytics and adaptive policy
- Security services

Home Automation

- Automation control for home management (Home Energy Management (HEM))

Neighborhood Area Network (NAN)

- Local power storage, local power management

Facility Management

- Building controls
- Deployment and managed services

Grid Observability

- Total awareness of grid state, utility assets, and prosumer interactions

IP-Based Smart Grid Communications

Smart Grid Requirements

- Interoperability across multiple vendors
- Protect data & system integrity
- Support for many types of media
- Rapid collection and analysis of massive amount of data
- Connect millions of devices
- Rapid response to bursty event–related message data
- Convergence of multiple existing networks

IP-Based Architecture

- Standards-based interoperability
- Built-in security measures and tools
- Flexibility for physical connectivity
- Practically unlimited scalability with IPv6
- High performance and congestion management
- Ability to prioritize traffic (QoS)
- Proven migration path from multiple proprietary protocols to IP architecture

Cisco's CPUC Filing

Deployment plans should be flexible and forward-looking

- Allow for future innovation, expect diversity in breadth of topics and level of specificity, modify over time

Interoperability Standards

- Monitor standards process at federal level
- What standards does California need to adopt, if any?

Think Broadly About Cyber-Security Policy

- Not just technology, but best practices
- Public/private partnerships
- Information sharing will be important

Lessons Learned from the Internet

1. Ability to Scale is Critical
   - Open standards, owned by non-profit organizations and networking industry groups, enable interoperability, growth, adoption and innovation
2. Think Security Day One
   - Retrofitting security is nearly impossible and current IP specifications mandate security considerations
3. Simplicity Over Perfection
   - IP is not optimized for any application yet it can serve all applications
4. Allow for Innovation in Core and at the Edges
   - Open communication and programmable endpoints lead to serendipity and innovation
5. Government can be Helpful
   - DOD helped fund the birth of the Internet in 1969